What is CDAT?
A brief tour

What is CDAT?

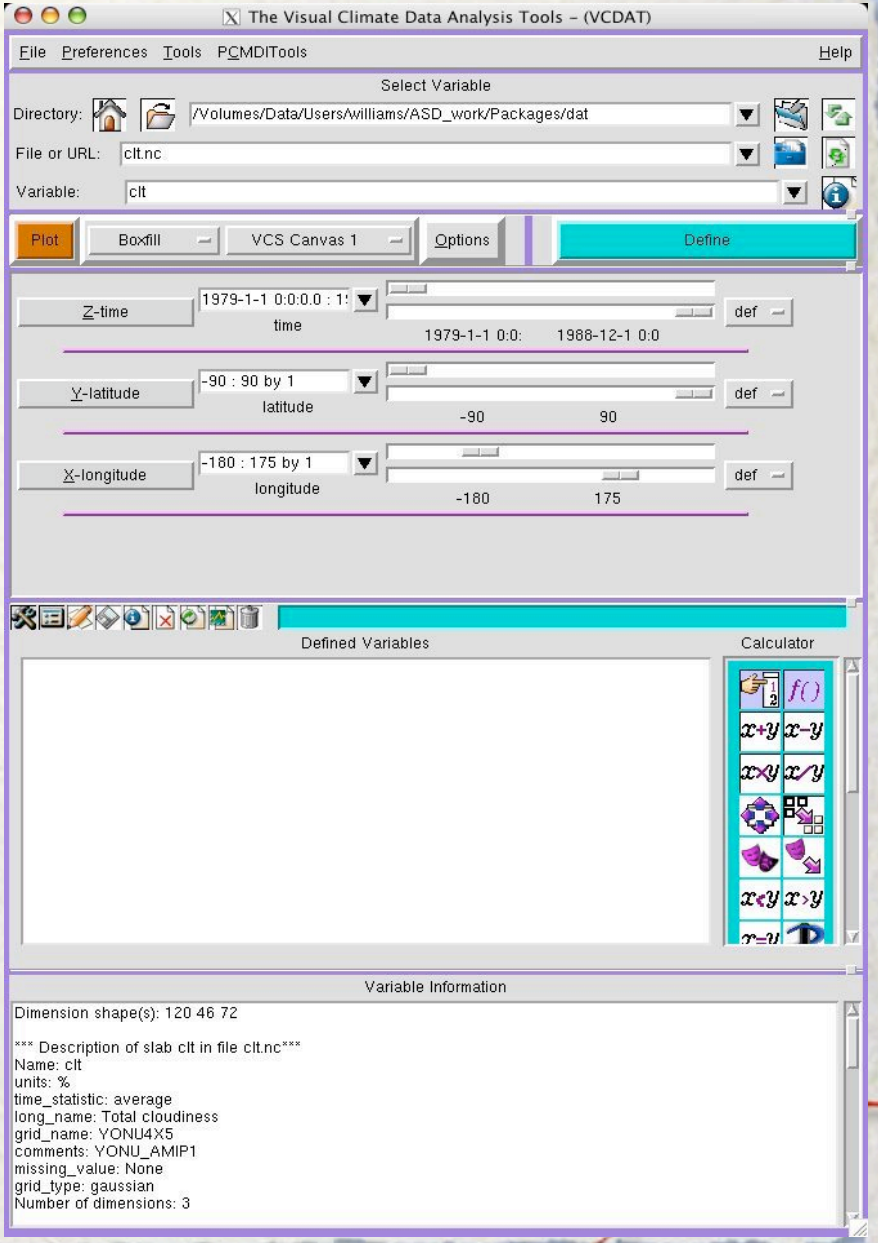
- **A quick tour of CDAT, showing:**
  - VCDAT – the CDAT GUI
  - Running CDAT from Python scripts
  - Running CDAT interactively
  - Applications on top of CDAT
  - Quick look at some code
  - Documentation – PCMDI portal

CDAT Propaganda

- Developed at the Program for Climate Model Diagnosis and Intercomparison (PCMDI), USA.
- Designed for climate science data
- Scriptable
- Analysis, conversion, sub-setting and array operations
- Interfaces to Fortran and C/C++
- Visualization system (VCS, Xmgrace, VTK)
- Graphical User Interface (VCDAT)
- XML representation (CDML) for datasets
- Integrated with other packages (such as LAS and OPeNDAP)
- Open-source and free
- URL: http://www-pcmdi.llnl.gov/software-portal

VCDAT – Visual CDAT

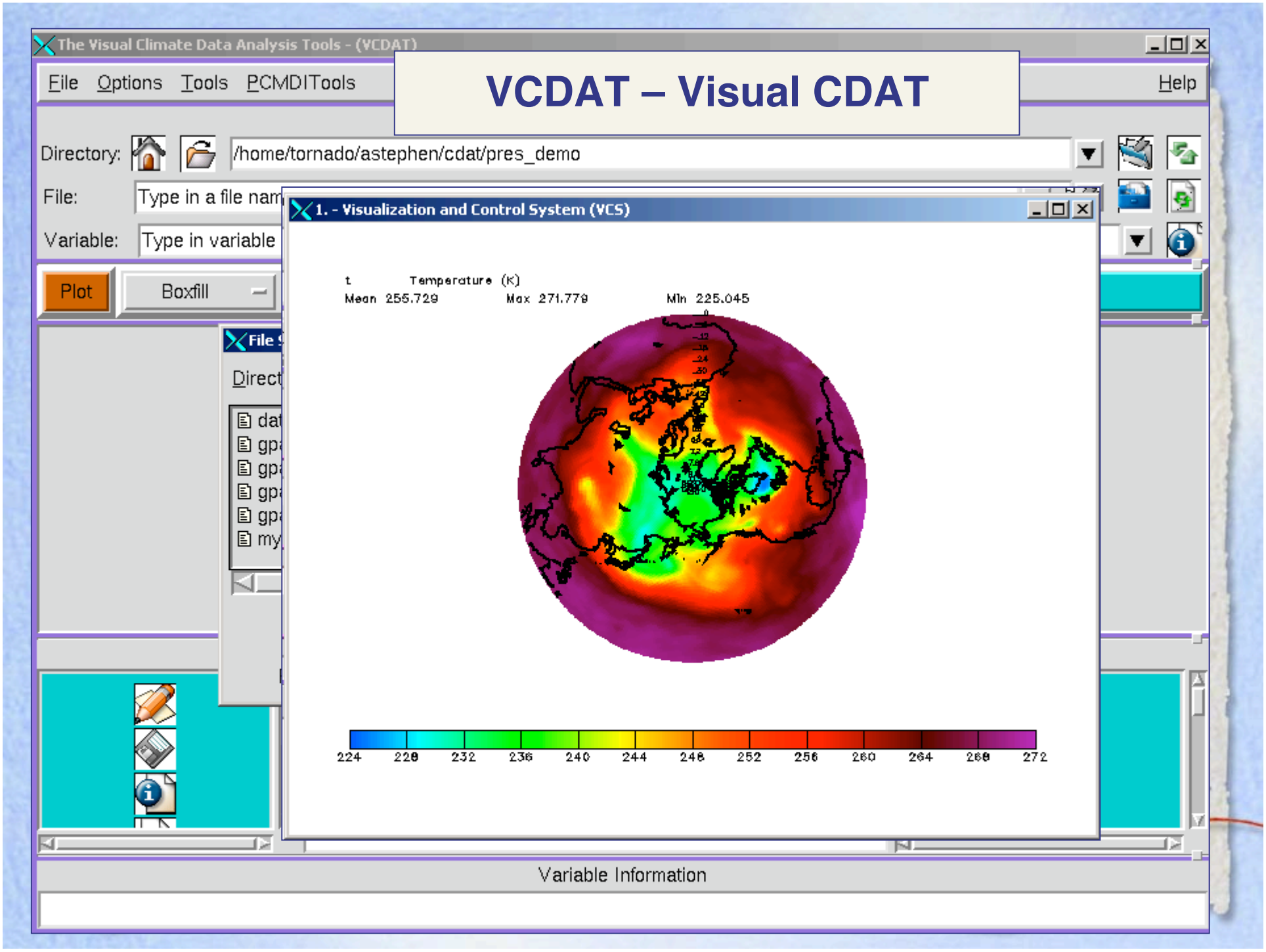
- VCDAT lets you get familiar with many parts of CDAT
- Start by typing "**vcdat**" at the command line.



VCDAT – Visual CDAT

- VCDAT is usually the first tool that newcomers to CDAT experience.
- It provides a Graphical User Interface (GUI) to CDAT's functionality.
- Advantages:
  - no need to learn scripting
  - incorporates different CDAT sub-packages seamlessly
  - provides tips on how to script CDAT.
  - allows interaction between GUI and command line

VCDAT – Visual CDAT



Running CDAT from Python scripts

- CDAT ***IS*** Python!
- You can combine with any python code.
- Python interfaces to Fortran/C/C++ allow you to bind to lower level languages.
- Python is really useful for other applications.
- Flexible control of data objects (*wave goodbye to loops*).
- You can build applications directly on top of CDAT since it is python.

Running CDAT from Python scripts

```
#!/usr/bin/env python

print "I am a python script."

print "Let's import some CDAT modules…"

import cdms, vcs

print "Open a data file, grab some data…"

f=cdms.open("myfile.nc")

var=f('temperature', latitude=(0,90),
      time="2004-12-17")

print "Plot the data…"

canvas=vcs.init()

canvas.plot(var)

print "So long!"
```

Running CDAT interactively

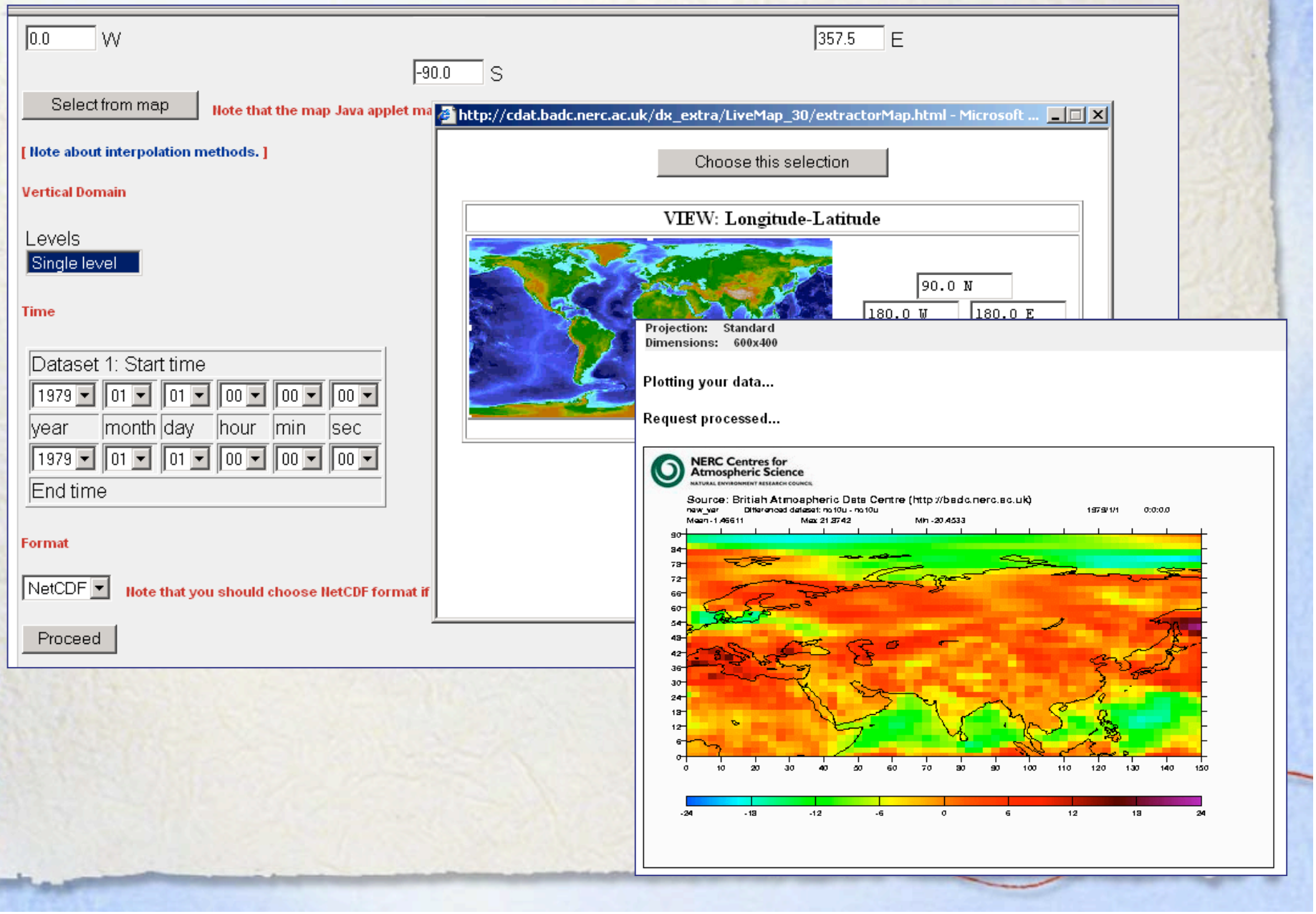
- You can work interactively with CDAT because python has an interactive prompt.
- Run '**python**', '**cdat**', or '**idle**':

```
>>> print "hello"
"hello"
>>> import Numeric
>>> arr1=Numeric.array([1,3,4,6], 'f')
>>> arr2=Numeric.array([3,1,0,-2], 'f')
>>> print arr1+arr2
[ 4., 4., 4., 4.,]
```

Applications on top of CDAT

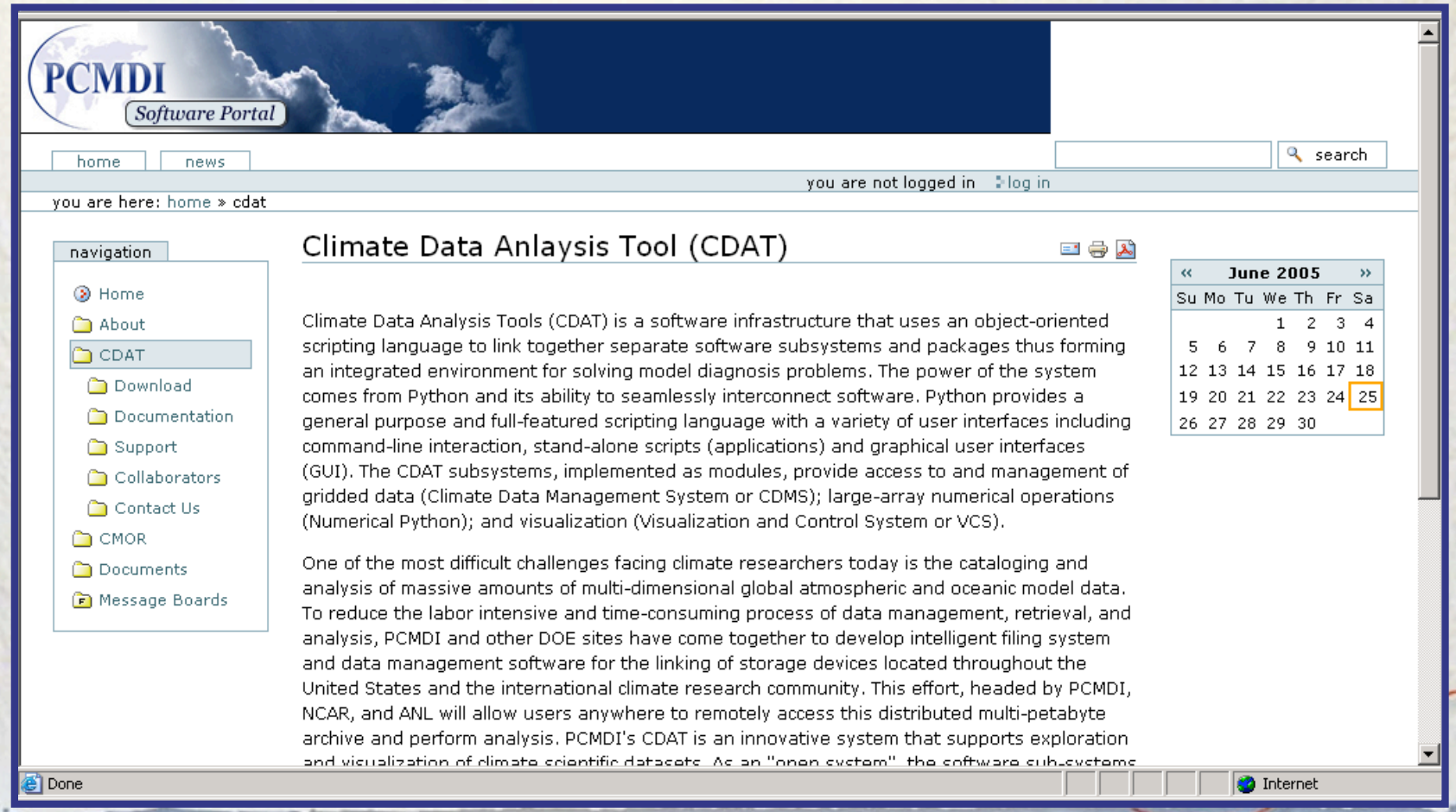
- Building on top of CDAT is simple, some example applications are:
  - BADC Data Extractor: http://cdat.badc.nerc.ac.uk/cgi-bin/dxui.py
  - NetCDF CF-convention checker: http://titania.badc.rl.ac.uk/cgi-bin/cf-checker.pl
  - ClimatePrediction.net: http://www.climateprediction.net

BADC Data Extractor



Typical usage examples of CDAT

- calculate a long-term average
- define wind-speed from u- and v-components
- subset a dataset, selecting a spatiotemporal region
- aggregate 1000s of files into a small XML file.

CDAT Documentation

- See searchable online documentation at:
  http://www-pcmdi.llnl.gov/software-portal/cdat